高科通信 GAOKE COMMUNICATIONS

Vango

V2051 Converter

User's Manual

Guangzhou Gaoke Communications Technology Co.,LTD

Vango Series V2051 interface converter

User's Manual

Production Version： V2051-05-03-520

Guangzhou Gaoke Communications Technology Co.LTD supplies overall technical sustainment for the user with open arms; the users can keep touch with the office of GaoKe and contact the customer service in the company directly.

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Preface

Organization Of This Manual

This manual describes the functionalities of V2051 interface converter, V2051 interface converter (single slot) and information about how to configure and test them in network application.

Chapter 1 Summary: introduces the characteristic and application of manufacture

Chapter2 Main Technical Features: introduce the main technical features of manufacture and predominance compared with congeneric product.

Chapter 3 Hardware characteristic: describes the principium、mechanical frame、the main technical specialty and working condition of V2051.

Chapter 4 Application: describes the common network and application.

Chapter 5 Installation Guide: introduce the facture and installation of power supply, board and interface cable

Chapter 6 NMS: introduces the software of NMS simply.

Audience

This manual is for network administrators, network engineer and technician.

Style convention

Table 1 Style convention used in this manual

Format	Meaning
\	Multi-level catalogs or menus are separated by '\' character. For instance "file\new\directory" means the menu item "directory" in menu "new" which are in turn in the menu "file".
	Used to highlight important area in diagrams.
<>	Indicates the input data from operating terminal
【】	Indicates one parameter configuration or a function
{ XX | XX }	Indicates a syntax of CLI command options, multiple command options in one "{}", separated by "|", means exclusive single selection
host（italic）	Indicates user specified parameters. e.g. for command: tftp *host* {get | put} {sys | cfg} *filename* The *host* and *filename* should be replaced by user specified real parameters, such as: tftp 138.0.0.102 get sys vxworks.bin

Table 2 Definition of mouse operation

Format	Meaning
Click	Pressing mouse quickly and releasing one button of mouse
Double click	Pressing mouse twice quickly in sequence and releasing one button of mouse
Drag	Pressing one button of mouse without releasing and move mouse

Table 3 Keyboard operation convention

Format	Meaning
[F]	"[]"means certain button of keyboard，such as [F] mean button F of keyboard
[Ctrl] + [C]	"+"means pressing several button to complete one operation at the same time, so "Ctrl+C" means press 'Ctrl' and 'C' button at the some time.

Flags

A set of flags are used throughout this manual and they have the meaning as explained below:

Warning：

Something important during the operation

Notice：

Explains and complementation to some content

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1. Summary

V2051 interface converter belongs to Vango series that developed by Gaoke Communication Technologies Co., Ltd. V2051 support one E1 interface, one V.35 synchronous interface and one 10Base-T/100Bse-TX self-adaptive Ethernet interface (If there is no special explanation, hereinafter referred to as Ethernet)

V2051 interface converter (If there is no special explanation, hereinafter referred to as V2051) is highly integrated and all of the design use the LSI.It can be point-to-point configured independently and also be connected with central node of C2810 concentrative Ethernet transceiving system via advanced network manager system to realize the full communication network management while its maintenance is very convenient. Gaoke Communication Technologies Co., Ltd. owns the self-developed IP (Intelligence Property) rights and provides useful resolution that accord with user's special function requirement.

To adapt the daily changing requirement of telecom operation, the V2051 series of our company are updated tightly with changing step. Considering there are still many users that use the old type V2051 of our company, we have a simple comparison and explanation of the slight difference in appendix A and appendix B to avoid the confusion.

2. Main technical features

(a) Realize V.35 data or 10Base-T/100Bse-TX data transparent cut-through on E1 link.
(b) E1 interface supports both framed and unframed mode.
(c) Unframed maximal E1 data rate is up to 2048kb/s; Maximal framed E1 data rate is up to1984kb/s with remote network management available.
(d) Ethernet interface support 10/100M and Half/Full duplex accord with IEEE802.3 standard protocol. Supporting auto-negotiation function and 802.3x flow control method; supporting transparent cut-through of Ethernet protocol, such as 802.1Q (WLAN), 802.1d, 802.1p, 802.3ad and so on.
(e) V.35 interface can choose DCE or DTE mode, and connect with standard V.35 interface of other DTE or DCE.
(f) Framed E1 interface can be connected with other Vango equipment which transfers Ethernet data via 2M link to realize the Ethernet bridge function.
(g) One facile E1/V.35 BER (Bit Error Rate) Tester is embedded for the detection of E1 link error by a method of transmitting and receiving array of pseudo random codes;
(h) V2051 can be in partnership with each other via E1 interface, and also can be point-to-point connected with the BRG, ETC, V35 units of C2810 central Ethernet transceiving system of our company to realize transparent cut-through of V.35 data or Ethernet data.

3. Hardware Characteristic

3.1 Fundamental

Conversion among interfaces of V2051 is implemented via automatic signal

identification of each interface, completing conversion option between E1 and 10/100M Ethernet interface, between E1 and V.35 interface or between V.35 and Ethernet.

3.1.1 Conversion between E1 and Ethernet

V2051's conversion between E1 and 10/100M Ethernet is aimed at transferring the Ethernet data over E1. Both E1 and Ethernet interface can be configured. Framed E1 interface support, n×64kb/s（n=1～31）, occupying TS1~TS31, and can be connected with bridges of other E1 interface-supported Vango equipment Unframed E1 interface rates up to 2048kb/s. The work flow is shown as figure 3-1

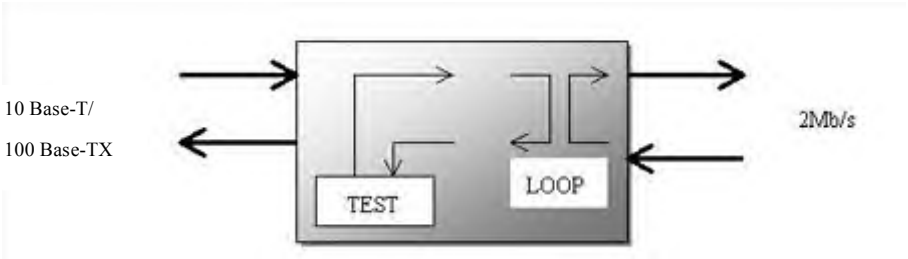


Figure 3-1 Fundamental of conversation between E1 and Ethernet

3.1.2 Conversion between E1 and V.35

V2051's conversion between E1 and 10/100M Ethernet is aimed at transferring the V.35 data over E1. Both E1 and V.35 interface both can be configured. Framed E1 interface support, n×64kb/s（n=1～31）, occupying TS1~TS31, and can be connected with bridges of other E1 interface-supported Vango equipment Unframed E1 interface rates up to 2048kb/s. V2051 can be connected with V.35 interface of the DCE or DTE equipment of other Vango series.. The work flow is shown as figure 3-2

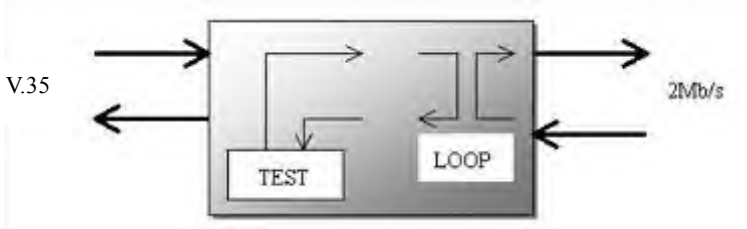
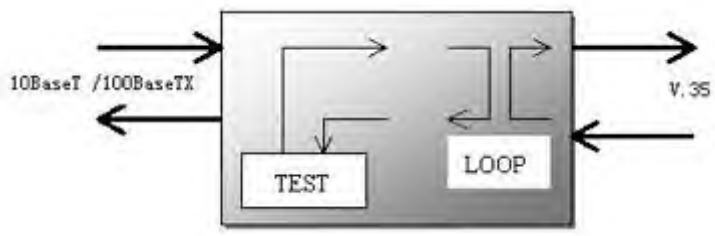


Figure 3-2 Fundamental of conversion between E1 and V.35

3.1.3 Conversion between V.35 and Ethernet

V.35/Ethernet conversion of V2051 is aimed at transferring 10BaseT/100BaseTx over V.35 link. The pair of V.35 interface should be configured as one DCE and one DTE. And the clock and data of DTE interface should be adapted to the DCE interface. The flow is shown as 3-3.



V2051 Converter

Figure 3-3 Fundamental of conversion between V.35 and Ethernet

3.2 Mechanical Framework

The Framework of V2051 adopts general-purpose box structure with the size of 202 mm×140 mm×36 mm (W*H*D). It can be put on table or other shelf. The signal interface and alarm led are placed in the front, two 8 digit switch at the side, and alternating power supply at the back.(Shown as figure 3-4)

Figure 3-4 a) V2051 appearance

Figure 3-4 b) Front view of V2051

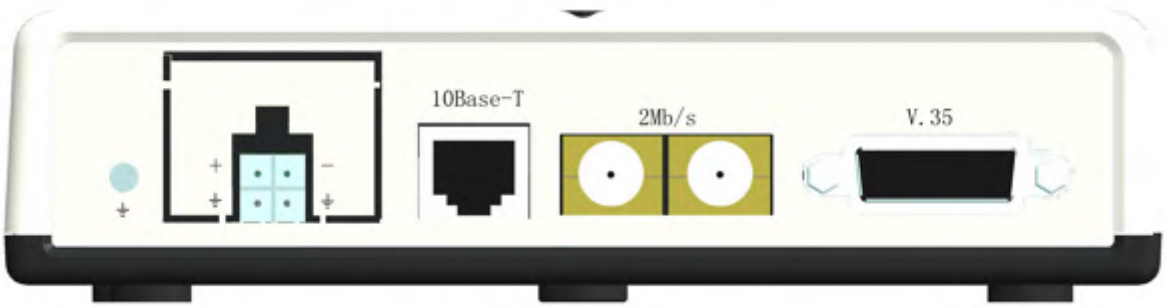


Figure 3-4 c) Back view of V2051

V2051 Converter

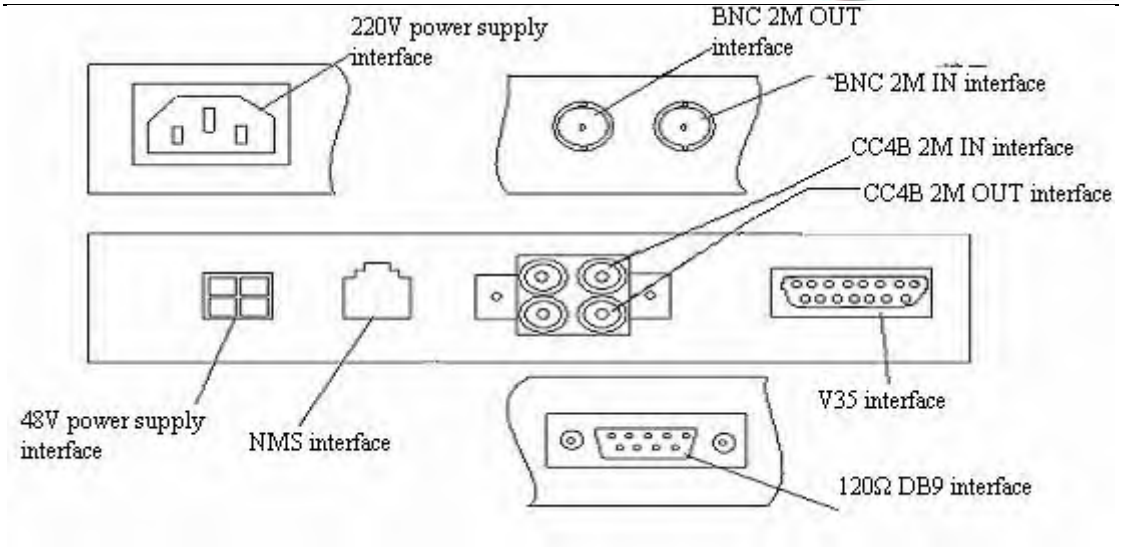


Figure 3-4 d) V2051 interface explanation

Figure 3-4 V2051 interface conversation appearance view

The back board includes Power supply interface, V35 interface, 2M interface, Network interface, shown as figure 3-4 c.

Power supply interface can choose from 48v DC or 220v AC(24v DC should be claimed before, we can offer it according to order), 2M interface can choose from 75Ω（BNC, CC4B）or 120Ω（DB9）.

3.3 Main Technical Parameter

3.3.1 2M interface(E1)

standard rate: 2048kb/s, offset tolerance ±102bit/s.

interface: A. 75Ω unbalanced, HDB3 code; B. 120Ω balanced, HDB3 code.

3.3.2 Data Interface

show as table 1.

Table 1 main technical parameter of data interface

Data type	Adaptation type	Mode	Rate
V.35	Synchronous multiplex	Synchronous	n×64 kb/s，maximal rate 2048 kb/s。
10Base-T/100Base-Tx	Network layer adaptation	Synchronous	10Mb/s, 100Mb/s。

3.4 Working Condition

a) Working voltage ： d.c ±48×(1±20%)V or a.c 220×(1±20%)V; (24v DC should be ordered)

b) Relative humidity： 10%-90%, not condensation;

c) Environmental temperature： 0°C~40°C;

d) Storing temperature： -30°C ~60°C;

e) atmospheric pressure： 86kPa～106kPa;

f) power consumption：3 W~5W.

4. Network Application

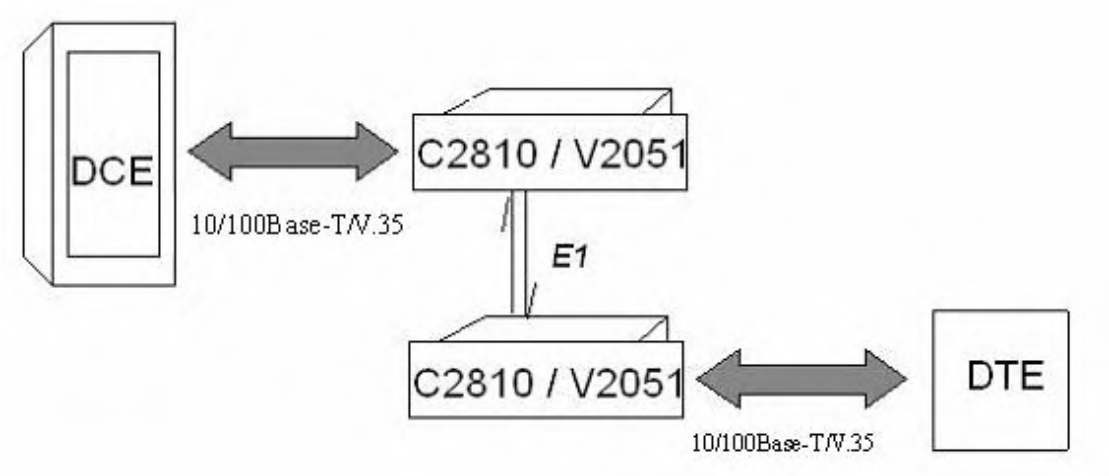


Figure 4-1 Network application of V2051

V2051 connect with the BRG or V35 unit of the C2810 concentrative Ethernet central node transceiving system, or another V2051, realizing the Ethernet or V.35 interface network bridge function.

While central node is C2810 concentrative Ethernet transceiving system and E1 interface work in framed model, the remote V2051 equipment can be managed and configured at central node, if only the up-to-date SW and firmware has been equipped.

5. Installation Guide

5.1 Check whether the equipment and spare part are all right

5.2 The connection of power supply wire

220V alternating current power supply connect with power supply cable wire directly.

Fix the power supply plug on +48V or -48V power supply wire and insert it in the power supply connection jack. Show as the followed figure.

Warning:

Only 48V is allowed when DC power supply is required. 24V should not be used unless special order has been made

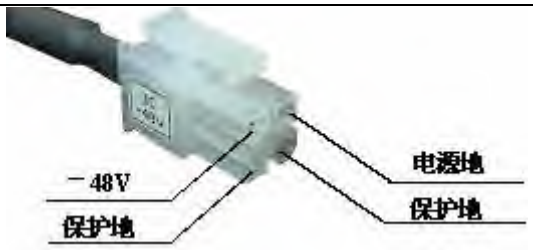


Figure 5 Connection of DC power supply wire

5.3 Connection of E1 signals

5.3.1 Connection of 75Ω signal interface

Cable connected with V2051 E1 interface must be SYV-75-2-2, Please Plug the connector into E1 interface of CC4B-4G or BNC-4G and then fix the screws. The connection can be learnt from figure 5-2, 5-3 and 5-4. The following are the detailed processes.

a) According to figure 5-2, use a knife to cut 7mm of the cable's cover, be careful not to cut the copper web (connecting the grand to protect), and then cut 2mm of the insulated layer, exposing the cable core.

b) Disperse the shield web, and remove the protection cover and the plug cover, weld the cable core to the jointing inside of the plug according to figure 5-3.Then use some tools to push and compress the copper pipe and make it a little distorted to fix the connection, cover the pyrocondensation glue cover and make it shrink, then put on the protection cover and the plug cover.

c) Connect the E1 signal according to figure 5-4 after the connector is ok.

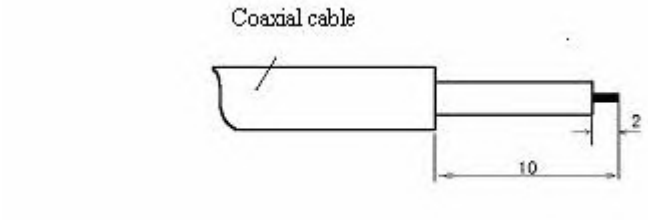


Figure 5-2 Coaxial cable

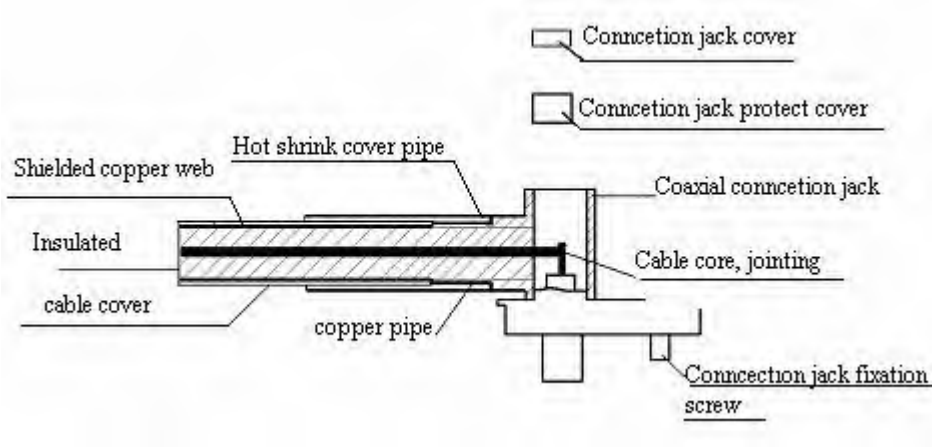


Figure 5-3 Facture and weld of coaxial cable connector

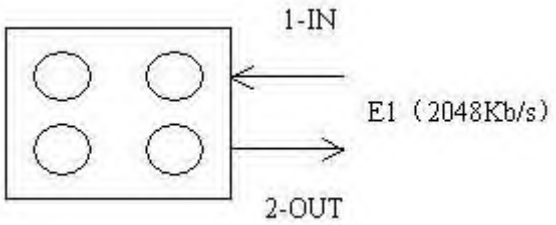


Figure 5-4 E1 signal come-out line of CC4B-4G

5.3.2 120Ω EI interface connection

120Ωimpedance E1 signal is connected directly by DB9, connecting pins

show as table 5-1.

Table 5-1 120Ω E1 signal output line table

Signal explanation	Input	Output	Grand
CC4B-4G	1、6	2、7	5

5.4 Ethernet interface

V2051 provide conversion between Ethernet interface and E1 interface. Framed E1 interface support n×64kb/s（n=1～31）. Unframed E1 interface data rate up to 2048kb/s. All of the rate configurations are realized by the 8-bit switch SAI in the inside circuit board. (Shown as figure 6-2)

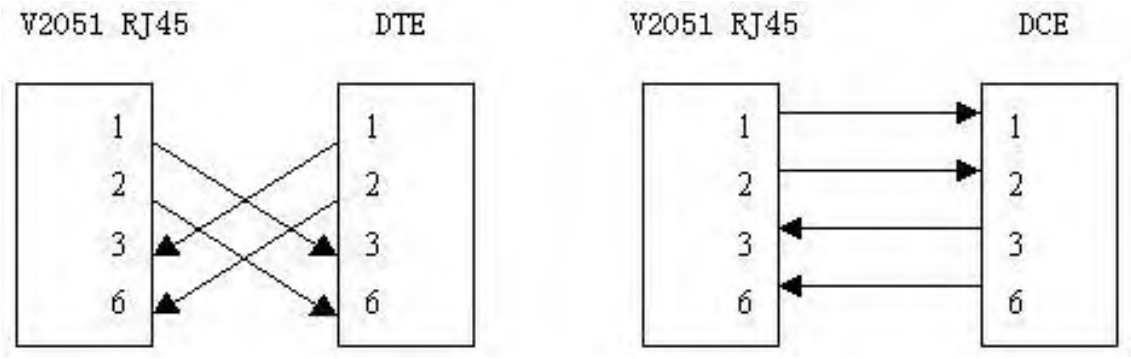
Ethernet interface connect LAN by twisted-pair and accord to IEEE802.3 standard. Faceplate indicator light LTX is data sending indicator and green light flashing or last lighting means Ethernet interface is sending data; LRX is data receiving indicator and green light flashing or last lighting means Ethernet interface is receiving data; LNK is link state indicator and green light lighting means interface connection of the other equipment is right.

Pins of RJ45 1 and 2 connection jack are data output of Ethernet interface while 3 and 6 are data output.

Warning:

For the high interface rate, 1 and 2 must be a twisted-pair, 3 and 6 also must be a twisted-pair while connecting the cable. (Cable corresponding relationship show as figure5-5)

Pins 3 and 6 of RJ45 connection jack at back board are Ethernet data input, while 1 and 2 are output. V2051 support auto-cross identification of Ethernet interface cable and both direct and cross cable can be chose , no matter connecting with DTE or DCE



cross **direct**

Figure 9 Connection of 10/100M Ethernet port and DTE/DCE

5.5 V.35 interface

V.35 synchronous data interface supported by V2051(V35) connect exterior line via DB15 needle negative connection jack, provide n×64kb/s (unframed maximal rate 2048kb/s, framed maximal rate 1984kb/s), occupy n 64kb/s time slot, and the occupied time slot and rate are set by switch or NMS.

Indicator light of this board lighting means V.35 signals inputting the channel and

flashing at about 2Hz means V.35 data is in loop-back mode.（please refer to the next section about indicator for details）. V.35 interface is a synchronous data interface, differed from the direction of clock connected by DTE and DCE, and can be configured through NMS. Table 5-2 and table 5-3 are corresponding pins .

V.35 interface is synchronous data interface, and differ from the direction of clock connected by DTE and DCE.

Table 2 Connection of DTE (DCE port)

15 pins (pin number)	Name	Direction	Explanation	Corresponding V.35 pin	level
1	GND	Dual direction	Protect ground (shield)	A	
2	SDA	To V2051	Send data A	P	V.35
9	SDB	To V2051	Send data B	S	V.35
5	CTS	From V2051	Sending is getting ready	D	V.28
12	DSR	From V2051	V2051 is getting ready	E	V.28
12	DCD	From V2051	V2051 receiving is ok	F	V.28
8	GND	Dual direction	Signal ground (shield)	B	
4	RDA	From V2051	Receive data A	R	V.35
11	RDB	From V2051	Receive data B	T	V.35
14	SCA	From V2051	Sending clock A	Y	V.35
15	SCB	From V2051	Sending clock B	AA	V.35
6	RCA	From V2051	Receiving clock A	V	V.35
13	RCB	From V2051	Receiving clock B	X	V.35
3	SCEA	To V2051	Exterior synchronization clock A	U	V.35

10	SCEB	To V2051	Exterior synchronization clock B	W	V.35
Note： Pins not be lined out needn't to be connected.					

Table 3 Connection of DCE (DTE port)

15 pins (pin number)	**Name**	**Direction**	**Explanation**	**Corresponding V.35 pin**	**level**
1	GND	Dual direction	Protect ground (shield)	A	
2	RDA	To V2051	Receive data A	R	V.35
9	RDB	To V2051	Receive data B	T	V.35
4	SDA	From V2051	Send data A	P	V.35
11	SDB	From V2051	Send data B	S	V.35
5	DTR	From V2051	Data terminal is getting ready	H	V.28
12	RTS	From V2051	Requiring sending	C	V.28
8	GND	Dual direction	Signal ground	B	
6	SCEA	From V2051	Exterior synchronous clock A	U	V.35
13	SCEB	From V2051	Exterior synchronous clock A	W	V.35
3	RCA	To V2051	Receive clock A	V	V.35
10	RCB	To V2051	Receive clock B	X	V.35
Note： Pins not be lined out needn't to be connected.					

6. Judgment and Operation of Failure

6.1 Faceplate indicator light

V2051 interface conversion device has consummate auto-alarm function, and the

equipment status is indicated by the LED in the front board. Explanation of the faceplate indicator light is shown as the table. And please refer to table 6-1 on how to get the failure indication via indicator light.

Table 6-1 panel indication light

Indicator light	Meaning
PWR	Green light last lighting means the power supply working is ok.
TD	Green light last lighting means V.35 interface is sending data (DTE interface output or DCE interface input); Green light flashing means E1 and V.35 interface is looping outwards to provide link test.
RD	Green light last lighting means V.35 interface is sending data (DTE interface output or DCE interface input); Green light flashing means E1 and V.35 interface is looping outwards to provide link test.
SG	Green light last lighting means E1 signal is inputting and working ok. Green light flashing means framed E1 signal is inputting but frame is asynchronous.
RMA	Yellow light lighting means framed E1 signal corresponding interface is alarming
LNK	Green light lighting means interface connected with other equipment is working ok
LTX	Green light flashing or last lighting means Ethernet interface is sending data
LRX	Green light flashing or last lighting means Ethernet interface is receiving data
LP	Green light last lighting means self E1 interface is looping outwards； Green light flashing means examined corresponding E1 interface is looping (Only transmitting Ethernet data is available.)
BER	Red light flashing quickly means tested E1 link has error code (Only available in BER test mode) Red light flash slowly means there is error in CRC checkout of Ethernet HDLC frame (Only available when transmitting Ethernet data.)

6.2 Definition of switch and jumper

V2051 has two 8-bit switch for the configuration of each port.

Table 6-2 SAI switch configuration

<table>
<tr><th colspan="2">Switch</th><th>Meaning</th></tr>
<tr><td rowspan="9">SA1</td><td>1</td><td>V.35 interface choice：OFF=DCE mode；ON=DTE mode</td></tr>
<tr><td>2</td><td>E1 transmission clock choice：
(1) Ethernet switch E1 model:
OFF=synchronizing to E1 receiving clock；ON=master clock
(2) V.35 switch E1 model:
OFF= synchronizing to E1 receiving clock
ON =master clock（DCE）/ synchronizing to V.35 receiving clock（DTE）（Fifth bit of SA2 is OFF）；
ON =master clock（DTE）/ synchronizing to V.35 receiving clock（DCE）（Fifth bit of SA2 is ON）
<table>
<tr><th></th><th>The second bit of SA1</th><th>First bit of SA1</th><th>The fifth bit of SA2</th></tr>
<tr><td>Synchronizing to V.35 clock</td><td>ON</td><td>OFF(DCE mode)</td><td>ON</td></tr>
<tr><td>Master clock</td><td>ON</td><td>OFF(DCE mode)</td><td>OFF</td></tr>
<tr><td>Master clock</td><td>ON</td><td>ON (DTE mode)</td><td>ON</td></tr>
<tr><td>Synchronizing to V.35 clock</td><td>ON</td><td>ON (DTE mode)</td><td>OFF</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>Framed E1 choice，OFF=framed, ON=unframed;</td></tr>
<tr><td colspan="3">E1 rate choice（ON＝0；OFF＝1）, The forth bit is MSB, the eighth bit is LSB.</td></tr>
<tr><td>4
5
6
7
8</td><td colspan="2">Framed：
64K：00001，128K：00010，192K：00011，256K：00100，320K：00101，384K：00110，448K：00111，512K：01000，576K：01001，640K：01010，704K：01011，768K：01100，832K：01101，896K：01110，960K：01111，1024K：10000，1088K：10001，1152K：10010，1216K：10011，1280K：10100，1344K：10101，1408K：10110，1472K：10111，1536K：11000，1600K：11001，1664K：11010，1728K：11011，1792K：11100，1856K：11101，1920K：11110，1984K：11111</td><td>Unframed only support 2048K ：00000</td></tr>
<tr><td colspan="3">Framed E1 signal configured by switch occupy time slot continuously. i.e., 64K occupying TS1,TS2, 256K occupying TS1~TS4. Configuring 1~31 time slot independently can be implemented by up-to-date NMS.</td></tr>
</table>

Table 6-3 Configuration of SA2

Switch		Meaning	OFF	ON
SA2	1	Link loop	Normal working mode	E1/V.35 data loop outwards
	2	Bit Error Rate test of E1/V.35 link	Normal working mode	BER test mode of E1/V.35
	3	CAS configuration	E1 without CAS	The 16th time slot of framed E1 transmit CAS
	4	DCD configuration-	DCD keeps high	DCD is high when effective E1 signal is detected and low otherwise
	5	Ethernet interface flow control configuration	IEEE802.3x flow control is on	Flow control is off
	6	Ethernet interface auto-negotiation	Auto-negotiation	Not auto-negotiation
	7	Rate configuration of Ethernet interface	100Mbps	10Mbps。
	8	Half/Full duplex configuration of Ethernet interface	Full duplex	Half duplex

Note: The red button in the front of V2051 has the same function as SA2-1. Pressing down the button means normal working condition, while pulling up means E1/V.35 data loop outwards.

Otherwise, inside of V2051 interface conversion device box, there are several jumper configured in the circuit board and J1/J2/J14 are provided to the users. When being suspicious of the 2M interface corresponding connection of equipment produced by other company, try to change the three jumper to settle the problem. The first bit configuration of SA2-1 switch will be unavailable if J15 is OFF. And the other jumpers should be kept default. J15, J13, J9, J5 are ON, 2 and 3 of J10 are ON, J7 and J8 are OFF.

6.3 Problem of application

Usual failures in V2051 adjustment can be judged by the status of indicator light, table 6-4 explain it in details. We hope the simple instruction can be

helpful for equipment maintenance.

Table 6-4 Failure appearance and disposal of V2051

Indicator light	Failure appearance and disposal
SG	Light not lighting means there is no data input of 2M interface. Whether there is signal in E1 input interface, and whether remote equipment has sent data, including examine remote sending equipment on or off should be examined. Light flashing means framed signal is losing synchronization, try to examine clock configuration and framed model is right or not.
RMA	Yellow light lighting means remote alarm of framed E1 signal. If there isn't any obvious alarm, looping section by section to remove the problem is recommended.
LNK	Green light lighting means connection with other equipment is ok. If the light is not up, examining the interface and joint line connected with V2051, we recommend to solve the problem by changing interface or joint line.
LTX	Green light flashing or last lighting means Ethernet interface is sending data, otherwise should examine whether there is alarm in E1 input interface, and data is right or not.
LRX	Green light flashing or last lighting means Ethernet interface is receiving data. If it keeps off, you should examine whether the remote equipment is sending data to the interface, such as whether the equipment is startup. Besides, you can examine network line is ok or not
TD	Green light flashing means E1 interface and V.35 interface is looping outwards to provide link testing. Green light last lighting means V.35 interface is sending data to DCE(V2051 is DTE at this time)or receiving data from DTE (V2051 is DCE at this time). Keeping off means there is no data transmitting via V.35 interface, you should examine remote V.35 equipment and whether there is data input of E1 input interface （framed and unframed were included）
RD	Green light flashing means E1 interface and V.35 interface is looping outwards to provide link testing. Green light last lighting means V.35 interface is sending data to DTE(V2051 is DCE at this time)or receiving data from DCE (V2051 is DTE at this time). Keeping off means there is no data transmitting via V.35 interface, you should examine V.35 corresponding equipment and whether there is data input of E1 input interface （framed and unframed were included）

LP	Green light flashing is loop indicator, pushing the first bit of switch SA2, E1 and V.35 interface data will loop outwards at the same time. When transmitting Ethernet data, green light flashing means corresponding E1 data is looping inwards; At this time, if you have configured it before, you needn't care about it; If you haven't configured, looping caused by wrong operation of the transmit line should be examined.
BER	Red light flash quickly in BER test mode means error code in 2M transmit line, examining whether the corresponding interface has configured loop and E1 link is right or not; Transmitting Ethernet data, not in BER test mode, red light flash slowly means CRC error check of HDLC frame is detected. Try to find whether time slot configuration of the two end of E1 accord strictly to configuration of CAS.

7. Network Management System

About remote V2051, if it work in framed mode and within a network controlled by C2810 of central node, the NMS information transmit via C2810 framed E1 signal of the central node. For configuration in details please refer to C2810 user manual. If the network is setup with only two same V2051, NMS can not be used.

Appendix A

Instruction of different type of V2051 interface conversion device

Besides the most up-to-date V2051, our company has produced three different type of interface transition device, instruction of their difference as followed。

Old type of V2051 interface conversion

Appearance, faceplate indicator lights and their definition of old type of V2051 interface conversion (print board specification number is GKT 7825372-C) are as same as the new, the difference between them are:

a) SA2 switch of the old type is only 4-digi;
b) Old type only support 10Base-T of IEEE 802.3, not supporting 100Base-TX model
c) The latter 4 bit of new V2051 is used to configure Ethernet model, but the configuration is not useful for the old type since it supports 10Base-T model only. Besides, PCB board in the box of old type configured a jumper J1 to configure clock model of V.35 interface.

Warning: New V2051 (print board specification number is GKT7825372-C, hereinafter referred to as –C) and the newest V2051(print board specification number is GKT 7825372-D, hereinafter referred to as –D), besides their appearance is different, their jumper definition is different too. J8 of –C specification is reposition switch. When J8 is closed, system is in reposition state and going back to work after opened. Making use of the jumper can warm boot equipment without closing or opening the power supply switch. Please don't change the jumper configuration casually, configuring it followed as the default configuration, other functions and switch configuration are as the same.

Switch definition of the old type V2051(print board number is GKT 7825372-A) are as followed:

Table A-1 Switch configuration of V2051 old type

<table>
<tr><td colspan="2">Switch</td><td>Meaning</td></tr>
<tr><td rowspan="9">SA1</td><td>1</td><td>V.35 interface choice ：OFF=DCE mode；ON=DTE mode</td></tr>
<tr><td>2</td><td>E1 transmission clock choice:
(1) Ethernet switch E1 model:
OFF=synchronizing to E1 receiving clock；ON=master clock
(2) V.35 switch E1 model:
OFF= synchronizing to E1 receiving clock
ON =master clock（DCE）/ synchronizing to V.35 receiver clock（DTE）
(J1 in box: OFF)
ON =master clock（DTE）/ synchronizing to V.35 receiver clock（DCE）
(J1 in box: ON)
<table>
<tr><td></td><td>The second bit of SA1</td><td>The first bit of SA1</td><td>J1</td></tr>
<tr><td>Synchronizing to V.35 clock</td><td>ON</td><td>OFF(DCE mode)</td><td>ON</td></tr>
<tr><td>Master clock</td><td>ON</td><td>OFF(DCE mode)</td><td>OFF</td></tr>
<tr><td>Master clock</td><td>ON</td><td>ON (DTE mode)</td><td>ON</td></tr>
<tr><td>Synchronizing to V.35 clock</td><td>ON</td><td>ON (DTE mode)</td><td>OFF</td></tr>
</table></td></tr>
<tr><td>3</td><td>E1 mode choice (framed or unframed)，OFF=framed, ON=unframed.</td></tr>
<tr><td colspan="3">E1 rate choice（ON＝0；OFF＝1）,The forth bit is MSB, the eighth bit is bottommost bit</td></tr>
<tr><td>4
5
6
7
8</td><td>Framed ：
64K：00001，128K：00010，192K：00011，256K：00100，320K：00101，384K：00110，448K：00111，512K：01000，576K：01001，640K：01010，704K：01011，768K：01100，832K：01101，896K：01110，960K：01111，1024K：10000，1088K：10001，1152K：10010，1216K：10011，1280K：10100，1344K：10101，1408K：10110，1472K：10111，1536K：11000，1600K：11001，1664K：11010，1728K：11011，1792K：11100，1856K：11101，1920K：11110，1984K：11111</td><td>Unframed：
2048K：00000</td></tr>
<tr><td colspan="3">Framed E1 signal configured by switch occupy time slot continuously, i.e., 64K occupying TS1,TS2, 128K occupying TS1 and TS2, 256K occupying TS1~TS4. Configuring 1~31 time slot independently can be implemented by up-to-date NMS.</td></tr>
</table>

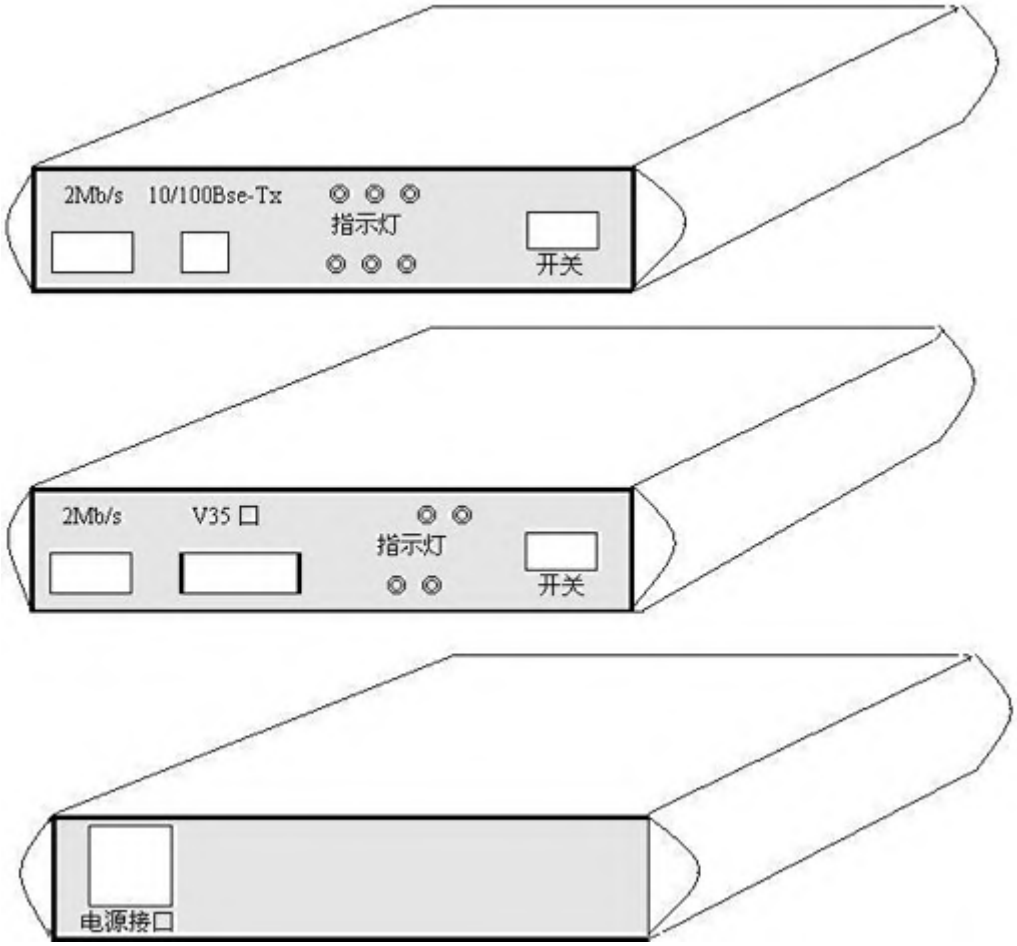
Table A-2 SA2 switch configuration of V2051 old type

Switch		Meaning	**OFF**	**ON**
SA2	1	Loop	Normal working mode	E1/V.35 data loop outwards
	2	E1 BER test	Normal working mode	E1/V.35 BER testing mode
	3	CAS configuration	Framed E1 without CAS	The 16th time slot of framed E1 transmit CAS
	4	DCD configuration	DCD keeps high	DCD is high when effective E1 signal is detected and low otherwise

Appendix B

V2051 interface conversion device (single slot)

Appearance of V2051 interface conversion device (single slot) greatly differs from the three types V2051 instructed above. Face of it is a black single box（show as figure B-1）, after loosening the screw in the faceplate, the inside PCB board can be inserted directly.



（From up to down, ETC front board, V35 front board and back board of them）

Figure B-1 V2051 interface conversion device (single slot) system board figure

V2051 interface conversion device (single slot) has two type. One is ETC, and it can transmit 10Base-T/100Base-TX Ethernet signal on E1 link; Another is V35, and it can transmit V.35 synchronous n×64k signal on E1 link. The definition of switch and indicator light are also very different, instruction as follows:

ETC(single slot) has three group of switch. There is a group of 8-digi switch in main control board and two group of 4 bit switch in the insertable board.

Table B-1 SW1 configuration of ETC main control board

Switch		Meaning
		Framed E1 signal CAS choice：ON=CAS including in 16th time slot；OFF= CAS not including in 16th time slot。
		E1 sender clock choice： ON=synchronizing with E1 receive signal；OFF=master clock

<table>
<tr><td rowspan="7">SW1</td><td>3</td><td colspan="2">E1 model choice (framed or unframed)： ON=framed；OFF=unframed</td></tr>
<tr><td colspan="3">E1 rate choice（ON＝1；OFF＝0），The forth bit is MSB, the eighth bit is bottommost bit</td></tr>
<tr><td>4
5
6
7
8</td><td>Framed：
64K： 00001，128K：00010，192K：00011，256K：00100，320K：00101，384K：00110，448K：00111，512K：01000，576K：01001，640K：01010，704K：01011，768K：01100，832K：01101，896K：01110， 960K：01111，1024K：10000，1088K：10001，1152K：10010，1216K：10011，1280K：10100，1344K：10101，1408K：10110，1472K：10111，1536K：11000，1600K：11001，1664K：11010，1728K：11011，1792K：11100，1856K：11101，1920K：11110，1984K：11111</td><td>Unframed：
2048k：00000</td></tr>
<tr><td colspan="3">Framed E1 signal configured by switch occupying time slot continuously. Such as 64K occupy TS1,TS2, 128K occupy TS1 and TS2, 256K occupy TS1~TS4. Configuring 1~31 time slot independently cooperate with the up to date NMS.</td></tr>
</table>

Table B-2 SW1 configuration of ETC board (configuration of Ethernet model)

Switch		Meaning	**OFF**	**ON**
Branch board SW1	1	Adaptive configuration of Ethernet interface	Adaptive model	Un-adaptive model
	2	Rate configuration of Ethernet interface	100M （Neglecting configuration of the third bit）	10M （The third bit must be OFF）
	3	Rate configuration of Ethernet interface	10M （The second bit must be ON）	100M（The second bit must be OFF）
	4	Duplex configuration of Ethernet interface	Full duplex model	Half duplex model

Table B-3 SW2 configuration of ETC board (configuration of MII interface model)

Switch	Meaning	**OFF**	**ON**

Branch board SW2	1	Adaptive configuration of MII interface	Adaptive model	Un-adaptive mode (recommend)
	2	Rate configuration of MII interface	100M （recommend）	10M
	3	Duplex configuration of MII interface	Full duplex （recommend）	Half duplex
	4	Flow control of configuration of MII interface	Starting and using 802.3 flow control （recommend）	Not using flow control

Otherwise, there is two independent jumper configured in circuit board and used for loop-back mode and BER test mode respectively. Configuration is as follows (ON means jumper is shorted, OFF means jumper is cut-off);

J1: Loop, OFF means normal working model, ON means error code testing model.

If chose ON at the same time, working in Loop model, tester is shield.

V35 equipment （single slot）has two group of switch, one is 8 bit, another is 4 bit.

Table B-4 SW1 configuration of V35

Switch		Meaning	
SW1	1	V.35 interface choice：OFF=DCE mode；ON=DTE mode	
	2	E1 error code tester model: ON=error code tester model; OFF=normal working model)	
	3	E1 model choice (framed or unframed):ON=framed; OFF=unframed.	
	E1 rate choice（**ON＝1；OFF＝0**），The forth bit is MSB, the eighth bit is bottommost bit		
	4	Framed： 64K：00001，128K：00010，192K：00011，256K：00100，320K：00101，384K：00110，448K：00111，512K：01000，576K：01001，640K：01010，704K：01011，768K：01100，832K：01101，896K：01110，960K：01111，1024K：10000，1088K：10001，1152K：10010，1216K：10011，1280K：10100，1344K：10101，1408K：10110，1472K：10111，1536K：11000，1600K：11001，1664K：11010，1728K：11011，1792K：11100，1856K：11101，1920K：11110，1984K：11111。	Unframed： 2048K：00000
	5		
	6		
	7		
	8		

Framed E1 signal configured by switch occupying time slot continuously. Such as 64K occupy TS1,TS2, 128K occupy TS1 and TS2, 256K occupy TS1~TS4. Configuring 1~31 time slot independently cooperate with the up to date NMS.

Table B-5 SW2 configuration of V35

Switch		Meaning
SW2	1	E1 sender clock choice： 1=ON， 2=ON：synchronizing with E1 receiver clock； 1=OFF，2=OFF：local master clock ； 1=ON， 2=OFF: synchronizing with V.35 clock； 1=OFF，2=ON： synchronizing with V.35 clock；
	2	
	3	
	4	Framed E1 signal CAS choice：ON=CAS including in 16th time slot；OFF= CAS not including in 16th time slot。

Besides, inside circuit board of V35 interface conversion device configured a jumper J1, using to enter outwards loop model. Configuration as follows: OFF means normal working model, ON means data of E1 interface is loop outwards. If J1 jumper and bit NO.2 of V35 SW1, the equipment enter in E1 outwards loop model, and tester is shield.

Faceplate indicator light of ETC V2051 interface conversion device (single slot) show as the followed table.

Table B-6 ETC faceplate indicator light

Indicator light	Meaning
LNK	Link state indication, green light lighting means interface connection with other equipment is right
RX	Green light lighting means Ethernet is receiving data from the corresponding equipment
TX	Green light lighting means Ethernet is sending data from the corresponding equipment
DUP	Green light lighting means Ethernet interface is building full duplex connection.
RMA	Yellow light lighting means corresponding interface alarm of framed E1 signal
LIS	Red light last lighting means no E1 signal inputting; Flashing means framed E1 signal is asynchronous.

Faceplate indicator light of V35 V2051 interface conversion device (single slot) show as the followed table.

Table B-7 V35 faceplate indicator light

Indicator light	Meaning
RX	Green light last lighting means V.35 interface is receiving data (DTE model)or sending data (DCE model); Green light flashing means E1 and V.35 interface is looping outwards to test the link.

TX	Green light last lighting means V.35 interface is receiving data (DCE model) or sending data (DTE model);Green light flashing means E1 and V.35 interface is looping outwards to test the link.
RMA	Yellow light last lighting means corresponding interface alarm of framed E1 signal
LIS	Red light last lighting means no E1 signal inputting in; Flashing means E1 signal frame is asynchronous.